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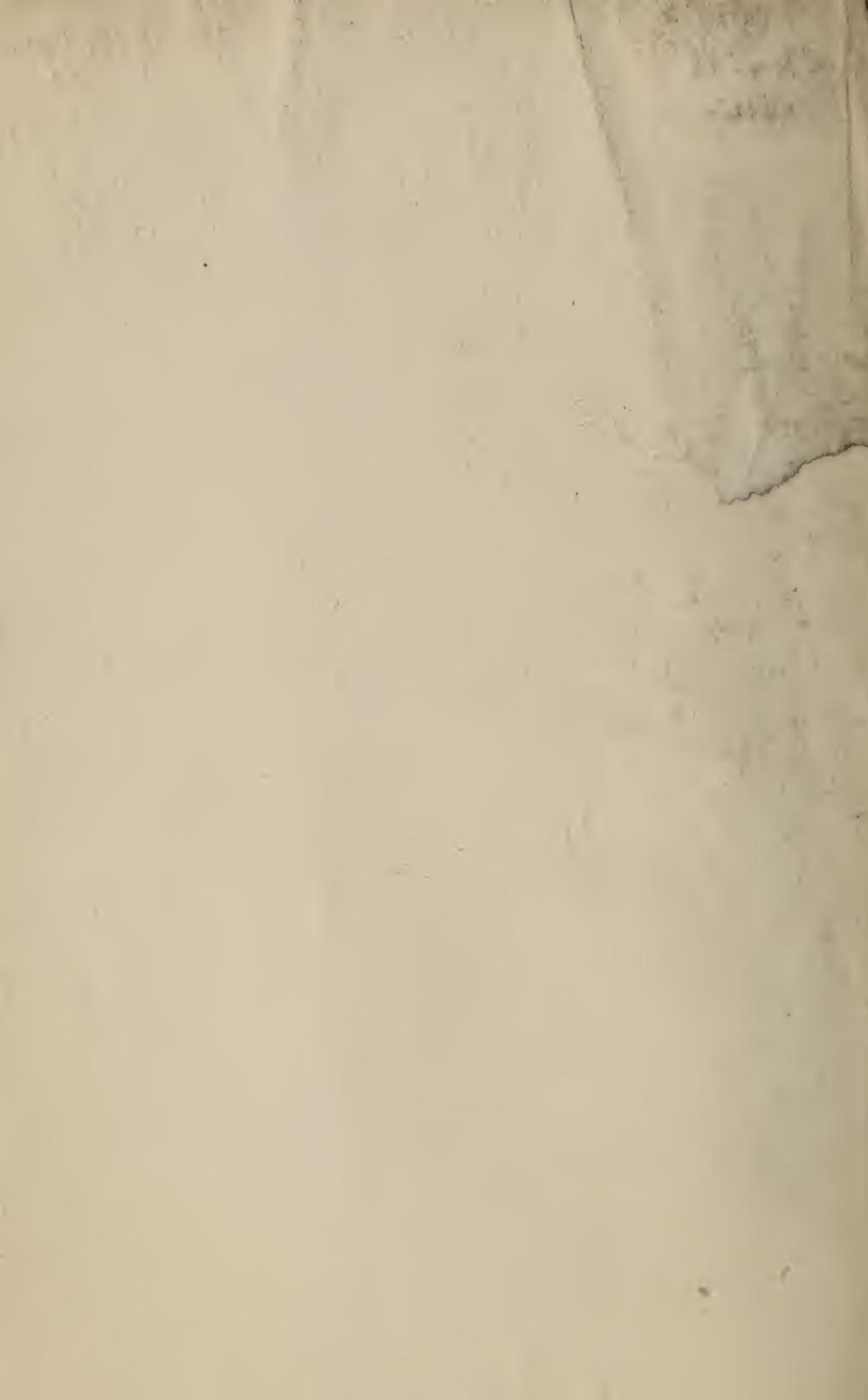
JUN 28 1916

SUMMER SESSION AT CAMP COLUMBIA COURSES IN SURVEYING AND GEODESY BOTANY AND GEOLOGY

ANNOUNCEMENT

1916

Camp Columbia
Morris, Connecticut





CAMP COLUMBIA

OFFICERS OF ADMINISTRATION
1916

NICHOLAS MURRAY BUTLER
President of the University

JAMES C. EGBERT, Ph.D.
Director of the Summer Session and Extension Teaching

J. K. FINCH, A.M.
*Assistant to the Director
Resident Director, Camp Columbia*

FRANK DIEHL FACKENTHAL, A.B.
Secretary, Columbia University

FRANK A. DICKEY, A.B.
Registrar, Columbia University

CHARLES S. DANIELSON
Bursar, Columbia University

OFFICERS OF INSTRUCTION
ASTRONOMY

HAROLD JACOBY, A.B., Ph.D.....Rutherford Professor of astronomy
WILLIAM BOWIE, B.S., C.E., A.M.....Inspector of geodetic work
United States Coast and Geodetic Survey (Associate)
EARL F. CHURCH, C.E.....Assistant United States Coast and
Geodetic Survey (Assistant)
L. N. MOELLER, C.E.....(Assistant)

BOTANY

BERNARD O. DODGE, Ph.D.....Instructor in botany

CIVIL ENGINEERING

J. K. FINCH, C.E., A.M.....Assistant Professor of civil engineering
ARTHUR M. BUSWELL, A.B., A.M....Instructor in sanitary chemistry
HAROLD S. HUTTON, C.E.....Highway and hydrographic surveys
L. N. MOELLER, C.E.....Plane table and topographic surveys
FRITZ C. NYLAND, B.S., C.E.....City, mine claim and solar surveys
DONATO ROMEO, C.E.....Leveling and repetition surveys
JOHN A. STRANG, C.E.....Pacing and farm surveys

GEOLOGY

FREDERICK K. MORRIS, A.M.....Instructor in geology

JOHN A. STRANG.....Secretary, Camp Columbia
HAROLD S. HUTTON.....Instruments and supplies
HARRY J. WIELER.....Secretary Y. M. C. A. and Medical Officer

SUMMER COURSES AT CAMP COLUMBIA
1916

Under the administration of the Summer Session, Columbia University offers courses in Astronomy, Botany, Civil Engineering and Geology at Camp Columbia, Morris, Conn. Courses in Astronomy and Civil Engineering are part of the prescribed work for students in the Schools of Mines, Engineering and Chemistry at Columbia University, but all courses are open to men students who have satisfied the necessary prerequisites.

Location—Camp Columbia is situated in Litchfield County, Conn., in the foothills of the Berkshires, about seven miles from the old and historic town of Litchfield and within a few minutes walk of Bantam Lake, the largest body of fresh water in the State. The Camp is ideally located at an elevation of 1,000 feet and the University property comprises a tract of almost six hundred acres of field, woodland and lake front property. Occupying a commanding site on the summit of a hill, the Camp enjoys fine views in all directions. The country is broken and rolling and is admirably adapted to practical work in the field, while the elevation, the admirable water supply, the thorough system of drainage and the exceptionally healthful climate render it a most suitable place for summer residence.

Conditions and environment are similar to actual field practice, and the University thus offers practical opportunities for field work which have been shown to be of great value.

The Camp consists of an administration building, instrument house, astronomical observatory, kitchen and dining hall, Y. M. C. A. building, three dormitories, boat house, a building containing lavatories and baths, barns and other farm buildings.

Date of assembly—A specified date of assembly is given in the following announcements for each course and students will be expected to report promptly. The date assigned is generally the Saturday preceding the Monday on which the actual work of the course begins. This is selected in order to allow the student to unpack and become thoroughly settled in his new surroundings, but in no case will students be permitted to report later than eight o'clock Monday morning. Failure so to report may result in the exclusion of the student from his Camp course.

Camp government—The officers responsible for the conduct of the courses at Camp Columbia have power to make such rules and regulations, subject to the approval of the University authorities, as may be deemed necessary for preserving the discipline of the Camp and for the proper conduct of the work. Students are not allowed to leave Camp without permission. Applications for leave must be presented to the officer in charge at least one day in advance of the beginning of the intended absence.

All student activities are under the control of a student board consisting of five members. Two elections are held during the summer.

Board and room—All students taking courses at Camp Columbia will be required to board and room at the Camp.

The cost of room and board will be about \$6.75 per week and is charged against the individual deposits. No reduction is made for absences of less than one day.

Rooms in the dormitories are furnished with cots and mattresses and drafting table, and are suitable for the accommodation of three persons. Students are advised to choose their room-mates, and by preference the men with whom their field work will be done. The entire Camp is lighted by electricity.

Arrangements for laundry work will be made with the steam laundry at Litchfield or Waterbury. Clothes should be carefully and plainly marked.

Instruments and equipment—The instrumental equipment maintained by the University is unusually complete. For the work in Plane Surveying, it comprises 43 transits, 25 levels, 9 plane tables, current meters, solar attachments, compasses, barometers, level rods, tapes, etc., and for the work in Geodesy a zenith telescope by Wanschaff, a transit instrument by Fauth, 4 theodolites, a chronograph, sextants, barometers, Invar tapes, etc. For the course in Limnology the necessary microscopes, Sedgwick-Rafter filters, thermophone, and other laboratory equipment will be supplied. A complete collection of rock forming minerals is available for students in Geology, together with petrographic microscopes, etc. The botanical laboratory is equipped with plant presses, dissecting lenses, camera and dark room.

Articles provided by students—The attention of men going to Camp Columbia for the first time is called to the following suggestions:

One large trunk and one traveling case will be sufficient baggage. The following articles will be found necessary or convenient: *Bedding, etc.*—One pillow, two pillow cases, three sheets, two double blankets and supply of towels and toilet articles for personal use. *Clothing.*—Students should provide themselves with heavy clothing for cold days. A suit of oil skins is probably the best outfit for rainy weather. A pair of knee-length rubber boots for wet weather and ordinary heavy outing or golf shoes with hob nails are necessary. Canvas trousers and ordinary cotton outing shirts make a good everyday outfit and a couple of flannel shirts are also needed. A soft felt hat is very useful. *Supplies.*—Drafting materials (not instruments), pencils, note books, writing paper, ink, etc., are sold in the Camp at cost. Students taking work in surveying should bring with them the following: *Drafting.*—A set of drawing instruments,

contour pen, slide rule, two triangles, one 45° and one 60°, one engineer's scale (preferably with ivory edge), and a 30-inch T-square. *Surveying*.—A ten-foot pocket tape graduated to feet and hundredths, and a canvas bag suitable for carrying lunch, stakes, books, etc. *Computing*.—A six or seven-place book of logarithms. *Geology*.—Collecting bag, hammer, compass, field notebook. *Botany*.—Hatchet, large bladed knife, hand lens, notebook. All necessary supplies for work in Botany and Geology will also be on sale at the Camp.

Mail address—Camp Columbia, Morris, Litchfield Co., Conn.

Baggage address—Bantam, Conn.

Express address—Particular attention is called to the fact that express packages for Camp Columbia should be sent to Bantam, Conn., not Morris, Conn. They are brought over to Camp by the Quartermaster at a nominal charge.

Telephone and telegraph addresss—Camp Columbia telegrams should be sent to Litchfield, Conn., and are forwarded to Camp by telephone. The Camp may be reached by local or long distance telephone by calling Litchfield, Conn.

Students are advised to observe the above instructions carefully and to leave suitable directions with those interested.

Railroad station—Camp Columbia is reached by the Litchfield Branch of the New York, New Haven and Hartford Railroad. The railroad station for Camp Columbia is Bantam.

Trains leave New York daily at 8.45 a. m. and 3.30 p. m.

It will be to the students' advantage to leave the Grand Central Station, New York, at 8.45* a. m. This train makes direct connections and reaches Bantam at about noon. The train which leaves New York at 3.30* p. m. is scheduled to reach Bantam at 6.40 p. m., but is seldom on time.

On Saturday an additional afternoon train is scheduled to leave New York at 1.18* p. m. and reach Bantam at 4.21 p. m.

Only one train is run on Sundays, leaving New York at 6.00* a. m.

Transportation to and from station—Conveyances for Camp Columbia, three miles from Bantam Station, meet all trains on the days appointed for classes to assemble. Attention is called to the requirements that all students must be in Camp not later than 8 a. m. of the Monday following the date scheduled in the announcement, and that students who report on dates other than those scheduled must notify the Resident Director at the Camp in advance so that proper arrangements may be made for transportation and accommodation. The charge for transportation to or from the station is fifty cents per person and twenty-five cents per trunk and will be charged against the student's deposit.

*This time should be verified by the student. It is subject to the usual change in R.R. time-tables. Call Information Bureau, N. Y., N. H. & H. R.R., Murray Hill, 7800.

Registration—All students other than regular students in the Schools of Mines, Engineering and Chemistry must register for courses at Camp Columbia either at the office of the Registrar of Columbia University, or at Camp Columbia.

Credits—All courses marked Credit I may be counted toward the degrees of A.B. and B.S. and appropriate diplomas in teaching. All courses marked Credit V may be counted toward the appropriate degrees in the School of Mines, Engineering, Chemistry and Architecture.

Fees and deposits—The attention of students is called to the fact that all payments for fees and deposits for Camp courses must be made at the office of the Bursar in University Hall, Columbia University, and the receipts presented to the Resident Director at the Camp upon the student's arrival. (Students not otherwise connected with the University will be permitted to forward money order for fees, payable to Columbia University, to Charles S. Danielson, Bursar, instead of making the payment in person.) No fees or deposits will be received at Camp Columbia.

University fee—A university fee of five dollars (\$5) is charged each student for each session. The fee entitles a student to take any course or courses offered during the session for which he is otherwise eligible.

Tuition fee—Tuition fees are charged for each course taken and are estimated at six dollars (\$6) per point. The number of points for each course is stated in the announcement for that course.

No part of any tuition fee will be refunded if the course for which it has been paid is not completed during the session of the school but no additional tuition fee will be charged for completing the course during another session.

Deposits for camp expenses—Every student must, when paying the fees for the Summer Session at Camp Columbia, make a deposit at the Bursar's office at Columbia University to meet Camp expenses, viz., board, laundry, charges for drawing materials, notebooks, etc.; also to cover any breakage, damage or loss of instruments or Camp equipment, and transportation between Bantam and the Camp. The Bursar's receipt for this deposit must be presented to the Resident Director upon the arrival of the student in Camp.

The amount of the deposit varies with the course or number of courses and is specified in the announcements below. Students intending to take two or more courses must deposit an amount equal to the sum of the deposits for the respective courses. A check for the balance of the deposit remaining to the credit of the student upon his withdrawal from Camp will be given him and will be payable upon application to the Bursar of Columbia University. These checks are also accepted for collection by the First National Bank of Litchfield. In case the total charges exceed the deposit the student will be subject to an additional assessment.

Information—All inquiries in regard to courses or students attending Camp Columbia should be addressed to the Director of the Summer Session, Room 301 University Hall, Columbia University, N. Y., or, after May 30, 1916, to the Resident Director at Camp Columbia, Morris, Conn.

COURSES IN BOTANY AND GEOLOGY

Prerequisites—No prerequisites are required for these courses.

Instruction—The two courses will be given together, about half the available time each week being used for each course. The work will consist of lectures, laboratory work and field trips for the examination of points of particular interest and the collection of specimens. Facilities for photographic work will be available and will be extensively used in connection with the field work. The courses are designed to cover the elements of botany and geology together with such practical application and field work as is necessary in making a survey of this region from the geological and botanical standpoint.

Text books and supplies—Students should provide themselves with the following: "Revised Textbook of Geology" by James D. Dana, edited by Wm. North Rice, American Book Co.; "Nature and Development of Plants" by C. C. Curtis, Henry Holt & Co., and "Handbook of the Wild and Cultivated Plants of the East" by C. A. Darling, Lemcke & Buechner. All necessary supplies such as compasses, notebooks, etc., will be on sale at the Camp.

Attention of students taking this combined course is called to the fact that extra credit of one point, making a total of seven points, will be given to students who complete this work and satisfy the other Camp requirements with an exceptionally high grade.

BOTANY

Botany 2S—Elementary botany. Credit I, 3 points. Given in connection with Geology 41S. Given but once each session.

Morphological and physiological studies on the life histories of plants in addition to field work on local flora. Special attention will be given to the study of the trees and shrubs with their parasitic fungi, mushrooms, etc. It is aimed to make the work in collecting, photographing and classifying the plants of various groups of such a nature as to be a contribution to the knowledge of the local flora.

Period—Total for both courses six weeks.

Deposit—Total for both courses \$50.

Students assemble July 10.

GEOLOGY

Geology 41S—Field geology. Credit I, 3 points. Given in connection with Botany 2S. Given but once during each session.

The Camp is located in a region of ancient crystalline rocks, which have had a geologically varied history. The work will begin with a study of rocks and lead

toward the deciphering of this history. Rock-forming minerals will be made familiar by sight and simple tests, and the rocks studied at the same time as the minerals. Structure will be considered in terms of dynamic processes, and studied experimentally and by field observation. The class will make three field trips weekly. A geological history and survey of the region will be prepared by the class.

Period—See Botany 2S.

Deposit—See Botany 2S.

Geology 5S—Six field trips. For students taking course geology 41S and for engineering students who will take geology 5 or 31 during the regular session at the University. Credit will be given for these trips and they may be taken instead of the regular field work required in connection with geology 5 or 31. No fee.

These trips include the study of dip and strike, the glacial and other geological formations and their relation to engineering work. They will be as follows:

1. To Lakeside thence eastward to Morris. 2. To Little Mt. Tom. 3. To Litchfield. 4. To Mt. Prospect. 5. To Waterbury Reservoir. 6. To Southbury or New Haven. In addition students taking geology 5 or 31 are required to take 1. The Dyckman and Spuyten Duyvil, and 2. The Speedway and Bronx trips in New York as no satisfactory substitutes are available near the Camp.

COURSES IN SURVEYING AND GEODESY

Prerequisites—The preliminary instruction for courses C. E. 15, 25, 26 and 27S is given by the Department of Civil Engineering* at the University and is known as C. E. 2. Equivalent courses are also offered in Extension Teaching† (el-2) and at Camp Columbia (C. E. 2S, see p. 12). Students who fail to receive a passing mark in C. E. 2, but receive a grade of D will be allowed to take course C. E. 15S, but will take the regular deficiency examination in September. Students who desire to receive credit for this course should submit their credentials, etc., to the Resident Director or to Professor R. E. Mayer of the Committee on Admissions, and in some cases may be required to take an examination before credit will be given. An examination will be held at Columbia University on July 3 and at Camp Columbia on July 8, and is also open to students who failed to receive D in C. E. 2.

The fee for this examination is \$5.

Course C. E. 23*, theory of railroad surveying, is required of all students before taking course C. E. 28S. A special deficiency examination will be held at Columbia University and at Camp Columbia on August 7 for students failing to pass C. E. 23 and in lieu of the regular deficiency examination in September, thus allowing these men opportunity to qualify for course 28 in time to take this work during the scheduled session.

The fee for this examination is \$5.

*See Announcement of Schools of Mines, Engineering and Chemistry.

†See Announcement of Extension Teaching.

In preparation for course C. E. 29S, students must have taken course C. E. 51-52* and have passed in at least one term of this work (i.e., either 51 or 52).

Preparatory to the work in Geodetic Surveying, students are required to take course Astronomy 105-106. This course covers the history, principles, computations, derivation of formulas, instruments, etc., used in geodetic operations. Students taking Astronomy 105-106 are required to submit a note-book which, if satisfactory, is afterward accepted as part of the required Camp record.

Instruction—Courses preparatory to the work at Camp Columbia are designed primarily to cover the elementary and fundamental principles necessary before the field work can be attempted. The detailed instruction for the work at Camp is given by specially prepared notes of instruction for each survey and by the instructor in the field. The theory and practice are thus worked out side by side and the student is required to prepare and submit his own notes and records of the work he has done.

No definite hours are assigned for field or office work in surveying, as the courses are conducted on the piece system. The office is open daily from 8 a.m. to 8 p.m., and each instructor has office hours during which students will submit their records, computations and maps for examination and checking. The rest of the day is spent by the instructor in the field advising and directing the various parties under his charge. Students usually work in parties of two or three* and are encouraged to select their own mates. Each party is advanced independently of the other parties, and when its work is completed, is allowed to leave Camp. The periods given in the following announcements represent the average time required for completing the work; nor do the Camp authorities ever require its completion more quickly than the announced period indicates. But if the authorities set a date when any given piece of work is to be finished, students will not be allowed to continue beyond the date set. Delinquents in such cases must complete the course at the next session. No credit is given for parts of surveys, nor are students allowed to continue work after the session ends.

Credit for courses in surveying—No student taking Camp courses will be excused from any part of any course on account of work done elsewhere, unless that work has been completed under the immediate direction of an instructor in an institution which grants degrees in mining or civil engineering. In some exceptional cases, however, the evidence of field-notes, maps and reports will be accepted by the instructor in charge.

*Except in case of course Astronomy 107, C. E. 26 and the work in Railroad Surveying. In the former the entire organization may include 30 to 40 students, and in the latter 8 to 10.

GEODESY

Astronomy 107S—Geodetic surveying. Credit V, 3 points. Given in connection with course C. E. 26S, but may be taken as a separate course. Required of all students in civil engineering during the summer between the third and fourth years. Given but once during each session.

The work consists in the development of a system of geodetic triangulation, to include measurement of base line with Invar tapes, angles with microscope theodolites, adjustment of primary quadrilaterals by the method of least squares, together with measurement and computations for the location of secondary stations for the triangulation of the hydrographic survey. See course C. E. 26S.

There is also included the use of the sextant for time and latitude; barometric hypsometry and trigonometric leveling; the level trier; the determination of latitude by zenith telescope, and longitude by star transit, chronograph, etc. In 1912 telegraphic signals for longitude were exchanged with the U. S. Naval Observatory at Washington, and a wireless station was installed during 1914 and the determination of longitude is now carried out by this means. A student organization consisting of chief engineer, chief computer, commissary of transportation, etc., attends to the details of administration under the direction of University instructors. Each student must submit computations, reports and record book.

Prerequisite: Course C. E. 25S and Astronomy 105-106.*

Deposit \$30.

Period—See course C. E. 26S.

PLANE SURVEYING

Civil engineering 2S—Theory of plane surveying. Credit I, V, 3 points. Equivalent to C. E. 2 which is required of all students taking courses in Civil, Mining, Metallurgical and Sanitary Engineering. This course is given primarily for men who desire to take course 15 but have not had the necessary prerequisite. It is given at the Camp during the period immediately preceding July 8 and students may then go on with course 15.

Methods of measuring angles and distances. Chaining. Cumulative and compensating errors, and corrections to be applied. Limits of precision. Use, care and adjustment of the engineer's transit, level and compass. Magnetic declination and variation. Local attraction. Traverses; computations of area and error of closure. Laying out and dividing up land. Relocation of old lines. Significance of monuments. System of public land surveys. Topographic surveys; transit, stadia and plane table methods. Text-book: Raymond's *Plane Surveying*.

Prerequisites: Algebra, geometry and plane trigonometry.

Deposit \$25.

Period—Lectures and recitations, two periods of 1½ hours each daily for two and one-half weeks. Students assemble June 21.

Civil engineering 15S—Plane surveying. Credit V, 3 points or 1 point per survey. Required of all students registered at Columbia University for the degree of Civil, Mining, Metallurgical or Sanitary

*See Announcement of Schools of Mines, Engineering and Chemistry.

Engineer. Designed to give students a thorough training in the principles of surveying and use of transit and level. Given twice each session. It consists of four parts or surveys.

Survey 1 includes pacing and chaining, ranging out lines, contouring with hand level, topography, mapping. *Survey 2* consists of the adjustment of the level, reciprocal leveling, determination of sensitiveness of level bubble, and in running a line of differential levels. Note book and report. *Survey 3* consists of the adjustment of the transit, angle reading by repetition, determination of stadia constant, observations to determine reliability of the compass, the survey of a closed field or farm, measuring the boundary lines by steel tape and the angles or directions by transit and locating the principal topographic details by stadia. Note books, computation of area and map. *Survey 4* consists of repetition traverse of a closed field, distances being measured by steel tape corrected for catenary, pull and temperature. Determination of azimuth by observation of Polaris.

Prerequisite: C. E. 2, or equivalent.

Deposit \$50 or \$15 per survey.

Period five weeks.

Students assemble June 3 or July 8.

Civil engineering 25S—Plane surveying continued. Credit V, 3 points or 1 point per survey. Required of all students registered at Columbia University for the degree of Civil or Sanitary Engineer. Given twice during each session.

This work includes the more advanced work of plane surveying and consists of four parts or surveys.

Survey 1 consists of running a line of levels for a highway improvement, plotting profile and computation of excavation. *Survey 2* consists of a topographic survey with plane table. Intersection, re-section, and traverse methods to be used, and map made. *Survey 3* consists of a topographic survey with transit and stadia; notebook and map. *Survey 4a*, city surveying, consists of the division of land into city blocks and subdivision into lots and the location of the street and lot lines; grade lines for streets and grades at street intersections; including map, profile and computation of excavation for street opening. Triangulation and location of lines for bridge piers, etc. Each student is also required to make solar observations both with a transit directly and with a solar attachment; this work, however, is not counted as a survey.

Prerequisite: C. E. 15S.

Deposit \$50 or \$15 per survey.

Period five weeks. Students may assemble on June 3 or July 8.

Civil engineering 26S—Hydrographic surveying. Credit V, 2 points. Given in connection with course Astronomy 107S for civil engineers and with course C. E. 26aS, for sanitary engineers. Required of all students in civil and sanitary engineering. Given but once during each session.

The geodetic work furnishes the data for a triangulation net for the hydrographic and topographic survey of Bantam Lake. This includes the location of shore line and shore topography, gage readings, soundings and sample of bottom and the rating of a current meter and observations with it and with floats for the discharge of streams. The work is carried out under the same student organization mentioned in course Astronomy 107S. Each student is required to submit a map, computations, notes and record book.

Prerequisite: C. E. 25S.

Deposit \$25.

Period—Civil engineering students will do this work in connection with Astronomy 107S, the combined courses requiring five weeks. Sanitary engineers will do this survey in connection with Civil Engineering 26aS, the required time also being five weeks. Students will assemble on July 5 for the combined courses.

Civil engineering 26aS—Limnology. Credit V, 2 points. Required of all students in sanitary engineering. Given but once each session.

This work covers the physics, chemistry and biology of lakes and reservoirs. The location of Camp Columbia near Bantam and adjoining lakes and ponds offers a favorable opportunity for the study of this subject which is of great importance in water supply work. The course includes a study of currents, waves and seiches, thermal stratification, stagnation effects, microscopic examination and the control of algae growth in reservoirs, turbidity, etc.

Prerequisite: Chemistry 78-79.*

Period—See C. E. 26S.

Deposit \$30.

Civil engineering 27S—Plane surveying continued. Credit V, 3 points or 1 point per survey. Required of all students in mining engineering and metallurgy. Given twice each session.

Same as C. E. 25S, except *Survey 4a* is omitted and *Survey 4b* is added. *Survey 4b* consists of the location of a mining claim 1,500 feet long by 300 feet wide in conflict with existing claims, and the determination of the area in conflict. The claim is located upon an outcrop of assumed dip and strike, in such a manner as to keep the center line close to the outcrop. Reports and maps.

Prerequisite: C. E. 15S.

Deposit \$50 or \$15 per survey.

Period same as for course C. E. 25S. Students may assemble June 3, but it will be to the advantage of students taking this course to report on July 8 and, having finished this work, to continue with course 28.

Civil engineering 28S—Railroad surveying. Credit V, 2 points. Required of all students in mining engineering. Given but once each session.

This work includes lectures on the economic principles of location as affecting branch lines and development railroads, and a complete survey for the location of a line two to five miles long, with all the attendant computations requisite for placing the work under contract. Reconnaissance, preliminary survey, location, cross-sectioning, computation, maps, plans, profiles, calculations of earthwork, estimates and cost. Daily conferences with instructor in charge of party.

Prerequisite: Courses C. E. 23,* 27S.

Deposit \$30.

Period three weeks. Students assemble August 12.

Civil engineering 29S—Railroad surveying. Credit V, 2 points. Required of all students in civil and sanitary engineering. Given but once each session.

*See Announcement of Schools of Mines, Engineering and Chemistry.



FIELD WORK



SOUTH HALL (DORMITORY)



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